

**CLAIMS**

What is claimed is:

1. A method for soil aerification comprising:  
inserting a turf drill into the soil while allowing the drill to rotate;  
withdrawing the turf drill from the soil while preventing the drill from rotating.
2. A method as recited in claim 1 wherein the inserting and withdrawing are performed by a reciprocating aerifier.
3. A turf drill chuck comprising:  
a receiver for holding a turf drill bit;  
a stud for mounting the chuck in a chuck holder;  
an arbor which moves longitudinally between a first position when a compressive force is applied to the arbor and a second position when a tensile force is applied to the arbor; and,  
a lock which engages when the arbor is in the second position and which prevents rotation of the arbor.
4. A turf drill chuck as recited in claim 3 wherein the lock comprises a spline and a keyway.
5. A turf drill chuck as recited in claim 3 wherein the lock comprises a generally cylindrical member which engages a member having a depression sized to fit the cylindrical member.
6. A chuck for a turf drill comprising:  
a rotating body having an upper central bore and a lower central bore for receiving the shank of a turf drill, the upper central bore having an upper cylindrical bushing and a lower bushing having a generally conical recess and the lower central bore having a set screw for engaging the shank of a turf drill inserted in the lower central bore;  
at least one set screw in the side of the rotating body having a generally cylindrical projection on one end thereof which projects into the upper central bore of the

rotating body when the set screw is fully engaged in the side of the rotating body; and,

a generally cylindrical shaft having a first end adapted to connect to a turf aerator and an opposing second end sized to rotatably and slidably fit within the upper central bore of the rotating body, said second end having a generally conical end adapted to fit within the conical recess of the lower bushing of the rotating body and a stop collar for preventing the withdrawal of the shaft from the upper central bore of the rotating body when a tensile force is applied to the shaft, the stop collar having an upper surface and a lower surface, said upper surface having at least one lateral depression sized and shaped to engage the generally cylindrical projection of the set screw in the side of the rotating body when a tensile force is applied to the shaft and torque is applied to the rotating body sufficient to rotate the rotating body such that the set screw projection is in axial alignment with the lateral depression in the upper surface of the stop collar thereby preventing further rotation of the shaft in the upper central bore of the rotating body.

7. A turf drill comprising:

a rotating body having an upper central bore and a lower central bore for receiving the shank of a turf drill, the upper central bore having an upper cylindrical bushing and a lower bushing having a generally conical recess and the lower central bore having a set screw for engaging the shank of a turf drill inserted in the lower central bore;

at least one set screw in the side of the rotating body having a generally cylindrical projection on one end thereof which projects into the upper central bore of the rotating body when the set screw is fully engaged in the side of the rotating body;

a generally cylindrical shaft having a first end adapted to connect to a turf aerator and an opposing second end sized to rotatably and slidably fit within the upper central bore of the rotating body, said second end having a generally conical end adapted to fit within the conical recess of the lower bushing of the rotating body and a stop collar for preventing the withdrawal of the shaft from the upper central bore of the rotating body when a tensile force is applied to the

shaft, the stop collar having an upper surface and a lower surface, said upper surface having at least one lateral depression sized and shaped to engage the generally cylindrical projection of the set screw in the side of the rotating body when a tensile force is applied to the shaft and torque is applied to the rotating body sufficient to rotate the rotating body such that the set screw projection is in axial alignment with the lateral depression in the upper surface of the stop collar thereby preventing further rotation of the shaft in the upper central bore of the rotating body; and,

a turf drill bit having a generally cylindrical upper portion and a spirally fluted lower portion said upper portion being held in the lower central bore of the rotating body by the set screw.

8. A turf drill as recited in claim 7 wherein the upper busing and the lower bushing are self-lubricating.

9. A turf drill as recited in claim 7 further comprising a grease fitting on the rotating body in fluid communication with the upper central bore of the rotating body for lubricating the shaft engaged by the upper and lower bushings of the rotating body.

10. A turf drill as recited in claim 7 wherein the turf drill bit comprises a tip having a pair of offset, opposing, generally planar surfaces each at an acute angle to the long axis of the bit such that a torque is imparted to the bit when the tip is inserted into the ground.

11. A turf drill as recited in claim 7 wherein the turf drill bit comprises a pair of generally helical flutes.

12. A turf drill as recited in claim 11 wherein the flutes are generally rectangular in cross section.

13. A turf drill as recited in claim 7 further comprising a generally circular dirt shield mounted concentrically on the shaft proximate upper cylindrical bushing.

14. A reciprocating aerifier comprising:

- a head which reciprocates in a substantially vertical direction;
- at least one rotating body having an upper central bore and a lower central bore for receiving the shank of a turf drill, the upper central bore having an upper cylindrical bushing and a lower bushing having a generally conical recess and the lower central bore having a set screw for engaging the shank of a turf drill inserted in the lower central bore;
- at least one set screw in the side of the rotating body having a generally cylindrical projection on one end thereof which projects into the upper central bore of the rotating body when the set screw is fully engaged in the side of the rotating body;
- a generally cylindrical shaft having a first end connected to the reciprocating head and an opposing second end sized to rotatably and slidably fit within the upper central bore of the rotating body, said second end having a generally conical end adapted to fit within the conical recess of the lower bushing of the rotating body and a stop collar for preventing the withdrawal of the shaft from the upper central bore of the rotating body when a tensile force is applied to the shaft, the stop collar having an upper surface and a lower surface, said upper surface having at least one lateral depression sized and shaped to engage the generally cylindrical projection of the set screw in the side of the rotating body when a tensile force is applied to the shaft and torque is applied to the rotating body sufficient to rotate the rotating body such that the set screw projection is in axial alignment with the lateral depression in the upper surface of the stop collar thereby preventing further rotation of the shaft in the upper central bore of the rotating body; and,
- a turf drill bit having a generally cylindrical upper portion and a spirally fluted lower portion, said upper portion being held in the lower central bore of the rotating body by the set screw.

15. An aerifier as recited in claim 14 wherein the upper bushing and the lower bushing of the rotating body are self-lubricating.

16. An aerifier as recited in claim 14 further comprising a grease fitting on the rotating body in fluid communication with the upper central bore of the rotating body

for lubricating the shaft engaged by the upper and lower bushings of the rotating body.

17. A aerifier as recited in claim 14 wherein the turf drill bit comprises a tip having a pair of offset, opposing, generally planar surfaces each at an acute angle to the long axis of the bit such that a torque is imparted to the bit when the tip is inserted into the ground.

18. An aerifier as recited in claim 14 wherein the turf drill bit comprises a pair of generally helical flutes.

19. An aerifier as recited in claim 18 wherein the flutes are generally rectangular in cross section.

20. An aerifier as recited in claim 14 further comprising a generally circular dirt shield mounted concentrically on the shaft proximate the upper cylindrical bushing.

21. A turf drill chuck comprising:  
means for engaging a turf drill bit; and,  
means for allowing rotation of an engaged drill bit during insertion of the drill bit into turf and preventing rotation of the drill bit during withdrawal from the turf.

22. A turf drill chuck as recited in claim 22 wherein the means for allowing rotation and preventing rotation is responsive to longitudinal forces on the turf drill bit.

23. A turf drill chuck comprising:  
means for engaging a turf drill bit;  
means for allowing rotation of an engaged drill bit during insertion of the drill bit into turf; and,  
means for preventing rotation of the drill bit during withdrawal from the turf.

24. A turf drill chuck comprising:  
means for engaging a turf drill bit; and,

means for allowing rotation of an engaged drill bit when a compressive force is applied to the drill bit and preventing rotation of the drill bit when a tensile force is applied to the drill bit.

25. A turf drill comprising:

a rotating body having an upper central bore and a lower central bore for receiving the shank of a turf drill, the upper central bore having an upper cylindrical bushing and a lower bushing having a generally conical recess and the lower central bore having a retainer for engaging the shank of a turf drill inserted in the lower central bore;

at least one generally cylindrical projection on the side of the rotating body which projects into the upper central bore of the rotating body;

a generally cylindrical shaft having a first end adapted to connect to a turf aerator and an opposing second end sized to rotatably and slidably fit within the upper central bore of the rotating body, said second end having a generally conical end adapted to fit within the conical recess of the lower bushing of the rotating body and a stop collar for preventing the withdrawal of the shaft from the upper central bore of the rotating body when a tensile force is applied to the shaft, the stop collar having an upper surface and a lower surface, said upper surface having at least one lateral depression sized and shaped to engage the generally cylindrical projection on the side of the rotating body when a tensile force is applied to the shaft and torque is applied to the rotating body sufficient to rotate the rotating body such that the projection is in axial alignment with the lateral depression in the upper surface of the stop collar thereby preventing further rotation of the shaft in the upper central bore of the rotating body; and, a turf drill bit having a generally cylindrical upper portion and a spirally fluted lower portion said upper portion being held in the lower central bore of the rotating body by the retainer.

26. A reciprocating aerifier comprising:

a head which reciprocates in a substantially vertical direction;

at least one rotating body having an upper central bore and a lower central bore for receiving the shank of a turf drill, the upper central bore having an upper cylindrical bushing and a lower bushing having a generally conical recess and

the lower central bore having a retainer for engaging the shank of a turf drill inserted in the lower central bore;

at least one generally cylindrical projection on the side of the rotating body which projects into the upper central bore of the rotating body;

a generally cylindrical shaft having a first end connected to the reciprocating head and an opposing second end sized to rotatably and slidably fit within the upper central bore of the rotating body, said second end having a generally conical end adapted to fit within the conical recess of the lower bushing of the rotating body and a stop collar for preventing the withdrawal of the shaft from the upper central bore of the rotating body when a tensile force is applied to the shaft, the stop collar having an upper surface and a lower surface, said upper surface having at least one lateral depression sized and shaped to engage the generally cylindrical projection on the side of the rotating body when a tensile force is applied to the shaft and torque is applied to the rotating body sufficient to rotate the rotating body such that the projection is in axial alignment with the lateral depression in the upper surface of the stop collar thereby preventing further rotation of the shaft in the upper central bore of the rotating body; and,

a turf drill bit having a generally cylindrical upper portion and a spirally fluted lower portion, said upper portion being held in the lower central bore of the rotating body by the retainer.